laid on a single larva varies from 1 to 68. The maggots, on hatching, bore their way through the skin of the host thus causing injury and even death of the infested larva. Infestation appears since the late first instar onwards, but the maximum incidence has been observed in the 3rd, 4th and 5th instars during the months of April to May and July to September resulting in nearly 10% loss in the production.

We express our deep sense of gratitude to the Director, British Museum, London, for the identification of the parasite.

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27. PREDATION OF THE PLUM SCALE, *EULECANIUM CORYLI* (L.) (HOMOPTERA : COCCIDAE), BY *BALLIA BAYADERAE* MULSANT (COLEOPTERA : COCCINELLIDAE), IN KASHMIR

The plum scale, *Eulecanium coryli* (L.), is a serious pest of plum, quince, apricot, almond and cherry in Kashmir. The brown coloured, mature female scales have a typical, swollen appearance, bearing an outward resemblance to spherical galls. The infested twigs look as if studded with countless, closely packed galls. Under field conditions, these scales are preyed upon by the larvae of the coccinellid, *Ballia bayaderae* Muls., chiefly during late March to early May which checks further multiplication of the pest to a considerable extent.

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28. FOOD AND FEEDING BEHAVIOUR OF THE MOLE CRAB *EMERITA HOLTHUISI* (CRUSTACEA : ANOMURA : HIPPIDEA)

INTRODUCTION

Mole crabs of the genus *Emerita* have evolved combinations of morphological and behavioural modifications which fit them in a hostile intertidal habitat. One of these, is a passive method of filtering food with their antennae.

In the present study some observations on feeding and antennular movements of *Emerita holthuisi* from the west coast of India were made under laboratory conditions. Observations on gut content were also made.

Material and Methods

Extensive mole crab beds are found in Mirya bay, situated 1.5 km west of Ratnagiri. The animals were collected from the beach at Ratnagiri from September 1973 to August 1974 and fixed in 10% formalin for observing gut contents. The stomachs were removed from fresh as well as previously collected animals and preserved in formalin. The contents were first examined with a low-power binocular microscope and the larger fragments were noted, the remainder being usually subsampled by pipetting a drop of the material on a slide and examining under higher magnification. The method followed by Hynes (1950) was used to determine the composition of different food items Charcoal particles were used instead of food particles to determine the feeding behaviour of the animal.

Results

The percentage of full stomach was more in rainy season than in other months (Table 1). The following components were observed in the gut.

Debris :

This category includes all unidentifiable finely divided material. The name is used in place of the more usual term 'debritus', since it was not known whether the material was organic or inorganic.

Table 1

Food of *Emerita holthuisi* as Percentage of Gut Content for the period September 1973 to August 1974

Month	No. of stomachs examined	Diatoms	Spicules	Sand	Foraminifera and Dinoflagellates	Invertebrate egg	Debris
	%	%	%	%	%	%	%
1973							
September ..	19	25	16	2	5	3	49
October ..	20	23	14	3	7	5	48
November ..	20	16	15	3	6	7	53
December ..	20	16	14	4	6	5	55
1974							
January ..	20	20	12	4	5	4	55
February ..	20	28	9	2	7	5	49
March ..	20	21	12	2	5	3	57
April ..	20	30	8	1	6	3	50
May ..	20	30	10	2	4	3	49
June ..	20	39	13	2	6	2	38
July ..	18	35	14	1	6	1	43
August ..	20	30	16	2	5	2	45

Diatom :

Phytoplankton dominated from June onwards upto September and then gave way to Zooplankton. Diatoms form a considerable part of the stomach content. From December upto July they form the main constituent of the gut contents. Diatoms belonging to the following genera were seen at different periods of the year. During January-February *Concinodiscus excentricus* and *Rhizosolenia semispina* were seen in abundance. From March onwards *Chaetoceras*, *Ditylium*, *Thalaniothrix*, *Stepanophyxix*, *Biddulphia* and *Fragilaria* were present in large numbers.

Small invertebrate eggs as well as traces of sand particles were seen in the stomach during September 1973 upto February 1974. Foraminifera and Dinoflagellates form an important constituent of the gut contents during the year.

It was noticed that in the antennular movement the food particles were entangled in all parts of the antenna, but the greatest concentration was at the ends of the shorter inner row of setae and particularly towards the distal end. Every few seconds one antenna was quickly bent into the cavity between the meropodites of the third maxillipeds and the mouth parts and was then withdrawn slowly as the mouth parts removed the food and sand grains. When clean it was extended again and filtering continued for a few seconds before the other antenna was cleaned in the same way. Rarely the same antenna was cleaned twice in succession, while the other one remained in the filtering position. Such repeated cleaning of the same antenna was most frequently seen when an animal was very close to the wall of the glass trough or to another feeding animal ; under these conditions the antenna nearest to the obstacle may either remain withdrawn or be filtering but is rarely cleaned.

The large door-like meropodites of the third maxillipeds are held close to the mouth parts when the animals were not feeding and, with their overlapping setal fringes form a barrier against the encroachment of sand that surrounds the mouth. During feeding their meropodites open outwards to form parallel sides to the mouth region. Even in this position, their setae partially close off the distal end against the sand. Thus the mouth parts can scrape the food off the antenna without taking in too much sand. It was noticed that as soon as an antenna was brought down for cleaning, movements of the propodite and dactylopodite of the maxilliped became quicker from side to side remaining almost parallel to one another all the time. This activity continued whilst the antenna was in the mouth region but as soon as it began filtering again the propodite and dactylopodite activity gradually decreased, to recommence when the other antenna was cleaned.

Discussion

E. holthuisi lives in one of the most rigorous habitats in the littoral zone. Zobell and Felthan (1938) showed that *Emerita analoga* could feed on bacteria but it seems probable that these animals were feeding on bacteria that had clumped and only to a very small extent on the individual cells. They showed that the larger bacteria (*Bacillus merinus* 1.3-8.1μ, *Flavobacterium boreale* 0.6-2.1μ) were used more efficiently than smaller ones.

In the present investigation it was found that feeding is not fully dependent upon the temperature and salinity but on the availability of food. Accordingly the gut contents showed variability in the percentage of their constituents. During the monsoon period the phytoplankton was seen in larger quantity while in other period it was less. The percentage of diatoms during the period November and December was less but increased from January onwards. After the monsoon the zooplankton

became the dominant constituent of the planktonic fauna.

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29. ON THE OCCURRENCE OF A FAIRY SHRIMP *STREPTOCEPHALUS SIMPLEX ECHINUS* IN THE FRESHWATER PONDS OF CHINGLEPUT DISTRICT, TAMIL NADU

(*With a text-figure*)

Systematic studies on Branchiopods, especially the phyllopods of India are fragmentary. The first record of phyllopods in India was *Streptocephalus dichotomus* by Baird in 1860. Another species, *S. simplex echinus*, was reported from Godavari town in Andhra Pradesh by Bond (1934). They occur along with *S. dichotomus*. *S. dichotomus* is the only species of this genus reported in Tamil Nadu, although Sanjeeva Raj (1951) reported the occurrence of yet another anostracan *Branchinella kugenumaensis*. During a survey of *S. dichotomus* in the temporary ponds of Chingleput district near Vedanthangal, Tamil Nadu, the occurrence of *S. simplex echinus* was noticed.

Males in the collection measured 18 to 20 mm in length and females 17 to 19 mm. The animals are semi-transparent, light brown in colour and smaller than *S. dichotomus*. Body and cercopods of both sexes of *S. simplex echinus* are relatively slender. The cercopods are bright red in colour in all the living specimens, whereas in preserved animals they become white and opaque.

The first antennae of both sexes are irregularly segmented. The second antennae of the male are well developed whereas in the female they are very small and narrow.

The length of the 2nd antennae in the male is about one half of the entire body length. The function of this antenna is said to be that of holding the female during copulation (Kaestner 1970). The dorsal row of spines on the main branch of the finger is more or less regular and does not run over on to the inner side of the branch (fig. 1). There is also a row of short, conical spines along the outer side of the main